

What is claimed:

1. An insulation product comprising:

a sheet of randomly oriented fibers bonded by a binder, said sheet having first and second major surfaces and a pair of side portions; and

5 a facing layer bonded to at least one of said major surfaces,

wherein a region of said sheet proximate to said facing layer is more puncture resistant than a remainder of said sheet.

2. The insulation product of claim 1, wherein said sheet is a rigid or semi-rigid insulation board.

10 3. The insulation product of claim 2, wherein said board is a fiberglass board having a fiber density greater than about 2.0 pounds per cubic foot.

4. The insulation product of claim 3, wherein said board has a thickness between about .5 to 2 inches.

15 5. The insulation product of claim 1, wherein said facing layer is selected from the group consisting of a polymeric, foil, paper, or FSK or PSK laminate layer.

6. The insulation product of claim 1, wherein said binder is a heat cured binder, said sheet having a higher percentage by weight of said heat cured binder in said region compared with a total percentage by weight of said binder in said sheet, thereby improving the puncture resistance of said region.

20 7. The insulation product of claim 1, wherein said sheet includes at least about 16 percentage by weight binder and said region is between about 25-33 percent of the thickness of said sheet.

8. The insulation product of claim 7, wherein said sheet includes a toughness improvement additive in said region.

9. The insulation product of claim 8, wherein said additive includes a latex additive.

10. The insulation product of claim 8, wherein said additive improves the toughness of said region by at least 10%.

11. The insulation product of claim 8, wherein said additive improves the tensile
5 strength of said region.

12. The insulation product of claim 8, wherein said additive comprises thermoplastic fibers that are meltbonded to said randomly oriented fibers at least in said region.

13. The insulation product of claim 7, wherein said sheet includes between about 16-25 percentage by weight binder.

10 14. The insulation product of claim 1, wherein said region includes a toughness improvement additive.

15. The insulation product of claim 12, wherein said additive includes a latex resin.

16. A method of manufacturing an insulation product comprising the steps of:

15 forming a web of randomly oriented fibers on a forming belt, said fibers being coated with a heat curable binder, said web generally having a first major surface and a second major surface and a pair of side portions,

wherein said web has a higher percentage by weight of said heat curable binder in a region of said web proximate to at least one of said major surfaces compared with a total percentage by weight of said binder in said web,

20 compressing and heating said web to form a sheet of said randomly oriented fibers bonded by said heat curable binder, said sheet having first and second major surfaces and a pair of side portions; and

affixing a facing layer to said at least one of said major surfaces of said sheet,

wherein a region of said sheet proximate to said facing layer is more puncture resistant than a remainder of said sheet.

17. The method of claim 16, wherein said sheet is a rigid or semi-rigid insulation board.

5 18. The method of claim 17, wherein said board is a fiberglass board having a fiber density greater than about 2.0 pounds per cubic foot.

19. The method of claim 16, wherein said facing layer is selected from the group consisting of a polymeric, foil, paper, or FSK or PSK laminate layer.

10 20. The method of claim 16, wherein said sheet includes at least about 16 percentage by weight binder and said region of said sheet proximate to said facing layer is between about 25-33 percent of the thickness of said sheet.

21. The method of claim 20, further comprising the step of providing a toughness improvement additive to said web, wherein said region of said sheet proximate to said facing layer includes said toughness improvement additive.

15 22. The method of claim 21, wherein said additive includes a latex additive.

23. The method of claim 21, wherein said additive improves the toughness of said region by at least 10%.

24. The method of claim 21, wherein said additive improves the tensile strength of said region.

20 25. The method of claim 21, wherein said additive comprises thermoplastic fibers that are meltbonded to said randomly oriented fibers at least in said region.

26. The method of claim 20, wherein said sheet includes between about 16-25 percentage by weight binder.

27. The method of claim 16, further comprising the step of providing a toughness improvement additive to said web, wherein said region of said sheet proximate to said facing layer includes said toughness improvement additive.

28. A fiberglass board insulation product, comprising:

5 a rigid or semi-rigid fiber glass board comprising randomly oriented glass fibers bonded by a heat cured binder, said board having first and second major surfaces and a pair of side portions and having a fiber density greater than about 2.0 pounds per cubic foot; and

a facing layer bonded to at least one of said major surfaces,

10 said board having a higher percentage by weight of said heat cured binder in a region of said board proximate to said facing layer compared with a total percentage by weight of said heat cured binder in said board, thereby improving a puncture resistance of said region.

29. The insulation product of claim 28, wherein said board includes at least about 16 percentage by weight binder and said region is between about 25-33 percent of the thickness of said board.

15 30. The insulation product of claim 29, wherein said board includes between about, 16-25 percentage by weight binder.

31. The insulation product of claim 28, wherein said region includes a toughness improvement additive in said region.

32. The insulation product of claim 30, wherein said additive includes latex.

20 33. The insulation product of claim 28, wherein said board has a thickness between about .5 to 2 inches.

34. A fiberglass board insulation product, comprising:

a rigid or semi-rigid fiber glass board comprising randomly oriented glass fibers bonded by a heat cured binder, said board having first and second major surfaces and a pair of side portions,

5 said board having a higher percentage by weight of said heat cured binder in a region of said board proximate to at least one of said major surfaces compared with a total percentage by weight of said heat cured binder in said board, thereby improving a durability of said region.

35. A building structure comprising a plurality of walls, at least a portion of said walls being insulated with an insulation product, said insulation product comprising:

10 a sheet of randomly oriented fibers bonded by a binder, said sheet having first and second major surfaces and a pair of side portions; and

a facing layer bonded to at least one of said major surfaces,

wherein a region of said sheet proximate to said facing layer is more puncture resistant than a remainder of said sheet.